

July 10, 1923.

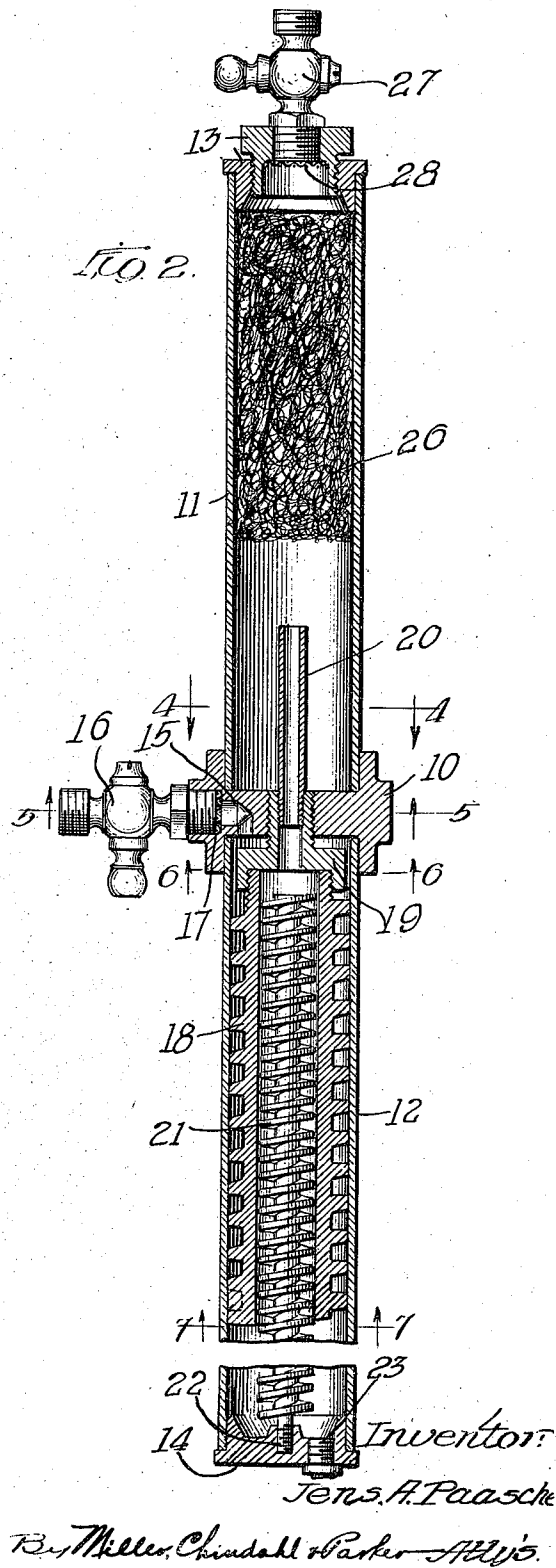
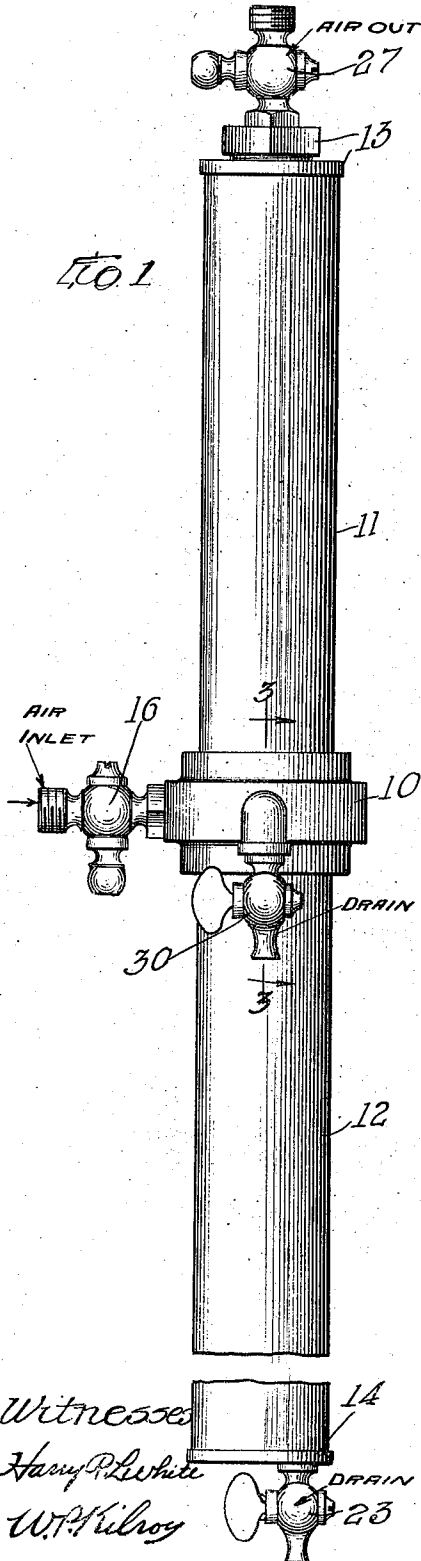
J. A. PAASCHE

1,461,045

AIR SEPARATOR

Filed Oct. 24, 1918

2 Sheets-Sheet 1



July 10, 1923.

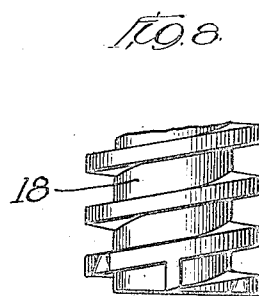
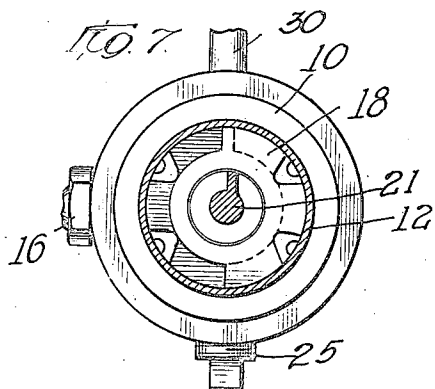
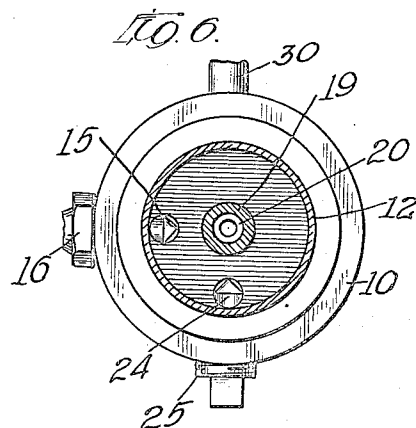
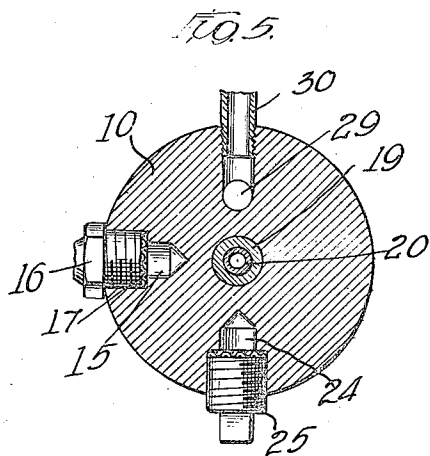
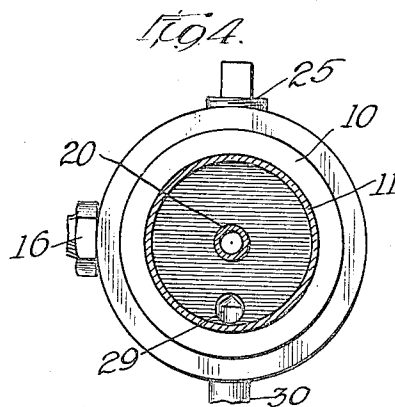
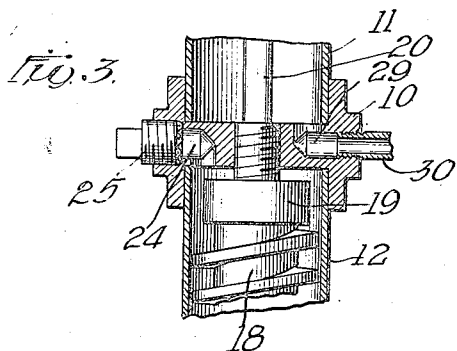
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AIR SEPARATOR

Filed Oct. 24, 1918

2 Sheets-Sheet 2



Witnesses:

Harry R. White

W. P. Kilroy

Inventor:

Jens A. Paasche,

By Miller, Chinsahl & Parker,
Attys.

UNITED STATES PATENT OFFICE.

JENS A. PAASCHE, OF CHICAGO, ILLINOIS.

AIR SEPARATOR.

Application filed October 24, 1918. Serial No. 259,539.

To all whom it may concern:

Be it known that I, JENS A. PAASCHE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Air Separators, of which the following is a specification.

This invention relates to means for separating moisture, oil or other foreign substances from air; and while the invention is capable of use in various ways, the device is particularly intended to be coupled into the air line of a pneumatic painting apparatus for the purpose of separating the foreign matter from the air so as to insure that the air delivered to the pneumatic paint brush will be pure and dry.

The object of the invention is to provide a separator of this character which is small, compact, and light in weight; which, at the same time, is of great capacity; and which is constructed so that it may be cheaply manufactured.

In the accompanying drawings, Figure 1 is a side elevation of a separator embodying my invention. Fig. 2 is a vertical or longitudinal central section therethrough. Fig. 3 is a fragmental vertical section in the plane of line 3—3 of Fig. 1 looking in the direction of the arrows. Figs. 4, 5, 6 and 7 are horizontal or transverse sectional views taken respectively in the planes of lines 4—4, 5—5, 6—6 and 7—7 of Fig. 2 and looking in the direction of the arrows. Fig. 8 is a fragmental elevational detail view of the outer one of the spiral conduit members.

While my invention is susceptible of embodiment in various forms, I have shown in the drawings only the preferred embodiment, but it should be understood that I do not thereby intend to limit the invention in any way, but aim to cover in the appended claims all modifications and equivalents falling within the scope of the invention.

Referring to Figs. 1 and 2, it will be seen that the separator herein shown comprises a central or intermediate head 10 having recesses in its upper and lower sides, into which recesses two tubes 11 and 12 fit in air-tight condition. The upper end of the tube 11 is closed by a head 13 and the lower end of the tube 12 is closed by a head 14.

The intermediate head 10 has an air passage 15 therein which opens at one end upon

the lower side of the head, the other end of said passage being enlarged and internally screw-threaded to receive one shank of a valve 16 or other connection, the opposite shank of which is adapted for attachment to a source of compressed air. Preferably a screen 17 is placed between the shank of the valve 16 and the shoulder formed by the enlargement of the passage 15, so as to prevent foreign particles of any appreciable size from entering the separator.

Within the chamber formed by the tube 12 is means for causing the air to travel through a long circuitous route in the chamber before passing therefrom into the next chamber. This means in the preferred form shown comprises a tubular member 18 having a plain cylindrical bore in its interior and having on its exterior a helical rib running from end to end thereof and fitting snugly within the tube 12 to form a channel for the air. This member 18 is attached to the head 10 by suitable means such as a fitting 19 threaded upon one end of the member 18 and having a central shank which is threaded into the head 10. A small pipe 20 is attached to the shank 19 and projects up into the chamber formed by the tube 11 a material distance above the head 10, for a purpose which will appear later. This pipe 20 virtually forms a continuation of the shank of the fitting 19.

Within the member 18 is another member 21 having an external spiral rib running from end to end thereof and fitting snugly within the bore of the member 18 to form an air channel. This member 21 has a central pin 22 which is threaded into the head 14.

The air entering through the valve 16 and passage 15 flows downwardly through the spiral passage provided by the member 18 and the wall of the tube 12 and thence upward through the spiral passage formed by the member 21 and the inner bore of the member 18, after which the air passes up through the fitting 19 and pipe 20 into the chamber formed by the tube 11.

The lower end of the member 18 is spaced a material distance above the head 14 so as to provide a chamber to receive the liquid condensation in its flow through the passageways mentioned. By reason of the contact of the air with the metal of which the parts of the separator are formed the moisture in the air will collect on the metal and

be condensed and flow down the spiral passageway of the member 18 to the open chamber at the bottom of the tube 12. A pet cock 23 provides means for drawing off the condensed liquid.

If desired, more than one air inlet may be provided in the head 10. I have herein shown another inlet passage 24 (see Figs. 3, 5 and 6) which passage is temporarily closed by a plug 25, but is adapted to receive an air inlet valve or other fitting such as the valve 16.

The upper chamber in the tube 11 is filled with a suitable straining, filtering or screening material 26, as, for example, excelsior, so that the air issuing from the pipe 20 must pass through such material before escaping from the separator. In the present instance the head 13 at the top of the tube 11 is made in two parts, the upper or inner part of which is threaded to receive an air outlet valve 27. Preferably a screen 28 is provided at the lower end of said valve to prevent the air from carrying with it any part of the straining material 26. Said straining material is not placed in the lower portion of the tube 11, so that an open chamber is formed to catch any condensation of moisture, oil or other material that may not be collected by the lower portion of the separator. The purpose of extending the conductor 20 upwardly from the head 10 is to prevent the condensed liquid in the chamber from draining back into the lower chamber. The head 10 has an outlet passage 29 therein, in the outer end of which is mounted a pet cock 30 (see Fig. 1) through which the condensation from the upper chamber may be drained.

I claim as my invention:

1. An air separator comprising, in combination, two aligned upright tubes, an intermediate head closing the adjacent ends of both tubes, heads closing the remote ends of said tubes, said intermediate head having an air inlet opening into the lower tube and having a drain cock opening from the upper tube, the uppermost head having an air outlet and the lowermost head having a drain cock, means in the lower tube for condensing and collecting moisture, and additional collecting means in the upper tube.

2. An air separator comprising, in combination, two aligned upright tubes, an intermediate head closing the adjacent ends of both tubes, the remote ends of said tubes also being closed, air inlet means in said intermediate head opening into the lower tube, means in the lower tube which provides a long, circuitous route through which the air must pass whereby to condense and collect moisture therein, said route opening into said upper tube, additional collecting means in said upper tube, drain cocks communicating with the lower ends of both

tubes for draining condensation therefrom, and air outlet means at the upper end of the upper tube.

3. An air separator comprising, in combination, two chambers, a single head closing one end of each chamber, air inlet means opening into one chamber, air outlet means communicating with the other chamber, drain cocks communicating with both chambers, means in the first chamber for causing the air to travel through a long, circuitous route and for delivering air into the second chamber, and means in the second chamber for further collecting foreign matter.

4. An air separator comprising, in combination, a partition, oppositely extending aligned tubular chambers extending from said partition, a plurality of radially extending passageways in said partition, one of said passageways communicating with the lower end of one of said chambers, and the remainder of said passageways communicating with the upper end of the other of said chambers.

5. An air separator comprising, in combination, air inlet means, a casing extending in both directions from said air inlet means to form two chambers, return flow means in one of said chambers for conducting gas to the end of said chamber and back through helical channels, a filling of straining material occupying part of said second chamber and an outlet at the end of said second chamber.

6. An air separator comprising, in combination, a tubular casing having an air inlet and an air outlet at its upper end, a member having an external helical rib fitting within said casing to provide a helical air channel for conducting the incoming air to the lower part of casing, said member having a tubular inner bore, and another member having an external helical rib fitting within said bore and providing a helical air passage to conduct the air upwardly toward said outlet, and means in the lower part of said casing for draining the condensation therefrom.

7. An air separator comprising, in combination, three concentric parts fitting one within the other and constructed to provide two helical air passages, means to admit air to the upper end of one passage, means to permit the out-flow of air from the upper end of the other passage, and means for drawing off the condensation from the lower ends of both passages.

8. An air separator comprising, in combination, a plug, an air outlet mounted in said plug, a tube extending from said plug, material adapted to strain air in the upper end of said tube, a flanged diaphragm closing the lower end of said tube and supporting the same, a second tube attached to the

- opposite face of said diaphragm, a plug closing the lower end of said second tube, a drain cock associated with said plug, a tubular member fitting in said last mentioned tube and having a helical flange defining a helical passage-way extending from the top of said tube to a point adjacent the bottom, a cylindrical member having a helical flange telescoped within said tubular member, said tubular member being apertured at its upper end and passing through said diaphragm, a discharge tube in the upper end of said tubular member extending above said diaphragm, an air inlet passage-way in said diaphragm communicating with the upper end of said lower tube and a passage-way in said diaphragm for draining off material from said upper tube, substantially as described.
9. A cleaner comprising a casing; a partition dividing the interior of said casing into a primary chamber and a secondary chamber, said primary chamber being cylindrical and said partition consisting of a wall forming the end of said primary chamber, said partition having an opening therein of smaller diameter than said primary chamber; means for causing the air in said primary chamber to rotate about the axis of said chamber; an outlet means for said secondary chamber; and a filtering medium in said secondary chamber so placed that there is a free expansion space between said partition and said filtering medium.
10. An air separator comprising, in combination, two closed elongated chambers, means in the first chamber for providing a long circuitous passage through which the air must pass whereby to condense and collect the moisture therein, filtering means in the upper end of the second chamber, means for delivering air from said first chamber to the second chamber at a point above the bottom of said second chamber and adjacent to the lower end of the filtering means, and separate devices communicating with the lower ends of said chambers for independently draining each of said chambers.
- In testimony whereof, I have hereunto set my hand.

J. A. PAASCHE.